

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
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Spectrum Policy Task Force Seeks Public)	ET Docket No. 02 – 135
Comment on Issues Related to Commission’s)	
Spectrum Policies)	
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Comments of Comsearch

Comsearch, hereby respectfully submits the following comments in response to the Public Notice DA 02 – 1311 (“Notice”) in the above captioned proceeding.

Comsearch is an independent engineering firm specializing in spectrum management of terrestrial microwave, satellite and mobile telecommunications systems. Comsearch works with the FCC and actively participates in various industry groups such as the National Spectrum Managers Association (NSMA) and the Telecommunications Industry Association (TIA) to develop rules, industry recommendations, and standards to promote efficient use of the radio spectrum. Comsearch has been providing spectrum management and frequency coordination services since 1977. In this role, we have gained extensive experience in developing industry standards, coordination processes, developing and maintaining state-of-the-art software and databases, and performing interference analyses and measurements of complex environments. It is from this perspective that we offer our insight into some of the spectrum policy issues outlined in the “Notice”.

We believe the following actions are necessary as part of any restructuring of the overall spectrum management policy.

- Better define a spectrum holders rights. A clear understanding of spectrum rights will provide more certainty of use and allow for the introduction of new policy mechanisms.
- Work to improve communication and cooperation between government agencies involved in spectrum management, including the FCC, NTIA and the State Department. Remove duplicative functions and consolidate operations where applicable. Create a unified U.S. approach to spectrum management and strive for global harmonization.
- Move to privatize many of the administrative functions of the FCC, such as licensing, database management, and enforcement
- Provide increased flexibility of band use to the extent feasible. Establish a general and flexible regulatory and technical framework (minimum requirements and standards) and let industry and the market dictate the specific interference and operational parameters.
- Move toward the use of secondary markets. Allow certain users to sell, trade and lease spectrum freely as long as they do not infringe on the interference rights of others.
- Increase attention and focus on interference issues and rights. Require some form of formal coordination and cooperation between users as a means to ensure that interference issues are considered.

- In lieu of auctions, consider the implementation of other market allocation methods such as spectrum usage fees based upon certain usage factors (bandwidth, efficiency, and interference potential) in bands where appropriate.
- Increase attention to enforcement. With the move to a market oriented allocation and assignment process, it will be necessary for the Government to be more vigilant in its monitoring and enforcement duties.
- Consider alternatives to the current licensing regime for Fixed Service applications in order to streamline product deployment such as “license by rule” or “blanket authorizations”. Eliminate the outdated 30-day public notice requirement. Look to industry registration and coordination as a means to facilitate operation

Market-Oriented Allocation and Assignment Policies

Spectrum Management is a complex and dynamic process comprised of technical, economic, and political components. Unless and until technology eliminates interference between devices, creating a virtual infinite spectrum resource, the need for ongoing management will be required. The Commission’s drive to let market mechanisms manage the spectrum will, in theory, allow greater flexibility and bring spectrum to the market more efficiently. The difficulty in this approach is that not all uses of the spectrum are necessarily “market” driven (e.g. public safety and unlicensed use).

Spectrum allocation and assignment based solely upon the “best and highest value use”, perhaps a laudable goal from the economist’s perspective, is not necessarily congruent with other tenets of spectrum management; such as spectrum efficiency and meeting the public interest.

Introduction and implementation of any market approach should be tempered with the needs and requirements of the users, should be gradually introduced over time and only where applicable, and should be varied according to particular applications. Auctions, for example, are applicable where there are likely to be more applicants than the spectrum can accommodate. This is particularly true when allocating spectrum for mobile or ubiquitous services on an area-wide basis. In this case, auctions appear to provide the fairest, most transparent and most effective means of assigning licenses to those who are likely to value them most. In the case of the Fixed Services, where the spectrum far exceeds the number of likely users, due to the highly directional nature of the transmission signal and subsequent high frequency reuse rate, auctioning of spectrum would be inappropriate and likely to have a negative impact on spectrum efficiency.

Under Part 101, point-to-point microwave frequencies are assigned using a system of site-by-site licensing and detailed frequency coordination. Since all users have access to the spectrum, service rules are required to maintain fair access and minimize the interference impact of the various licensees' systems on each other. Examples of these rules are directional antenna requirements, power and EIRP limitations, bandwidth limitations, and spectral efficiency (bps/Hz) requirements. The Part 101 system of assigning frequencies results in a high degree of re-use and spectral efficiency. For example, multiple licensees may re-use the same frequency at a single site, and a frequency may be re-used many times by many licensees in a city.¹

¹ According to our records, there are approximately 1,000 individual licensees operating on over 135,000 frequencies in the 18 GHz band on a licensed interference free basis.

It is difficult to imagine that the same density and efficiency of frequency assignments would be achieved under a system of geographic licenses and spectrum trading/leasing. Rather than being able to assign the best frequencies for a link based only upon engineering considerations, users would have to base their assignments primarily upon what spectrum was available for lease in a given area. We believe this would be a significant limitation, artificially creating a scarcity of frequencies. Would the economic benefit of removal of restrictive service rules such as antenna requirements, power limitations, and bandwidth limitations offset the cost of reduced spectral efficiency? We do not believe this would be the case.

One alternative to reduce the Commission's involvement in licensing individual facilities for point-to-point microwave would be to assign area licenses but not to consider these licenses to be mutually exclusive with each other. These licenses would be similar to the temporary fixed authorizations that many telecommunications carriers currently possess. As is the case with the temporary fixed authorizations, use of these area licenses would be subject to completion of frequency coordination for the individual links to be used. Either notification to the Commission or registration in a database of operational links would then be required to complete the authorization process.

Another alternative to auctions for point-to-point microwave and other similar services would be to implement a system of spectrum usage fees. Even at a minimal price level, we believe usage fees would have the benefit of improving spectral efficiency by encouraging users to turn in and delete unused licenses. This would limit spectrum

warehousing and improve the quality of the frequency coordination databases. At higher price levels up to the full opportunity cost of microwave versus other alternatives, usage fees would return to the treasury significant funds for the use of the valuable public spectrum resource. Usage fees at nominal price levels could be quickly and easily implemented while usage fees at higher price levels should only be implemented over a period of time that allows licensees to depreciate their microwave equipment and fairly consider other transmission alternatives. In areas not subject to frequency congestion, fees should be set no higher than a nominal level.

For site based deployments, a graduated cost structure of spectrum usage fees could be developed which rewards individuals for choosing the most efficient technologies (bandwidth, antenna pattern, antenna height, ATPC, EIRP, etc.) and penalizes those that wish to use less efficient technologies. This methodology would allow the flexibility of users to implement a wide variety of fixed systems with limited technical restrictions. These fees would encourage users to license the minimum amount of spectrum necessary, turn in licenses when not using them, stop warehousing of spectrum, and use spectrally efficient technologies. We note that other countries, including the UK have moved to this type of approach.

The Commission should move forward to allow for secondary use of spectrum. There may be many legal issues to resolve before this concept can be implemented, but from a technical perspective we see no reason to limit a licensee's ability to lease the spectrum he has acquired through auction. The following should occur with secondary markets:

- The licensee of record retains ultimate responsibility for use of the spectrum
- The secondary user must abide by all of the rules and regulations pertaining to the spectrum in which they operate
- Secondary use contracts must explicitly spell out the interference rights and obligations
- Sufficient penalties and enforcement must be in place to monitor for potential abuse

We are concerned that interference rights and obligations may lose importance and the appropriate attention in a secondary market as new operators of the spectrum become further removed from true ownership responsibilities. While the primary licensee should retain ultimate responsibility regarding how the spectrum is utilized, they will lose direct control when the spectrum is conveyed to a third party.

The Commission should look to industry registration, coordination and management of devices wherever possible. In lieu of individual site licensing, a simple easy to use web-based registration (similar to Internet domain name) could be implemented. This would reduce the Commissions regulatory burden while at the same time ensuring the availability of system data. This would allow the industry the ability to develop and implement coordination and deployment procedures and police itself. This would apply to all devices that are not nomadic and consumer oriented.

Interference Protection

Most frequency coordination for point-to-point microwave is done using a single definition of harmful interference: an interfering transmitter may degrade the threshold of

a victim receiver by no more than 1 dB. On a case-by-case basis, additional degradation may be negotiated if the link reliability can be shown to still meet the licensee's standards. We believe that this approach to defining harmful interference would continue to be used under market-oriented frequency assignment policies, and we do not know of any other way to equitably define harmful interference that would result in a greater efficiency of frequency assignments.

Determination of the interference level that results in 1 dB of threshold degradation is done using threshold-to-interference (T/I) curves measured and published by the equipment manufacturer. The T/I data is measured for an actual transmitter causing interference to an actual receiver and therefore the effects of the receiver characteristics and filtering as well as the transmitter characteristics are included in the data. Thus this is an example of the consideration of receiver characteristics in judging harmful interference.

Power limits at service area boundaries are not an effective means of controlling interference when high gain directional antennas are used as is the case with point-to-point microwave. At the EIRP levels necessary for high link reliability, microwave beams will often exceed any reasonable service area boundary power limitation. However only in the unfortunate case of the antenna beam being directed towards a receiver on the other side of the boundary would there be a likelihood of harmful interference. Therefore, as opposed to power limits, the effective means of managing point-to-point spectrum is a system of frequency coordination where links are studied against each other and conflicting frequency assignments are avoided.

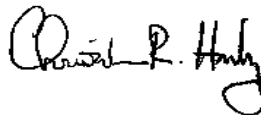
Power limits can serve the purpose of defining conservative objectives that can be used as default parameters, however the key to successful interference control is in the requirement for affected parties to coordinate their spectrum usage and the ability to enter into agreements and negotiation regarding appropriate interference protection. Those that are unwilling to negotiate can fall back on the more conservative FCC standards.

Spectral Efficiency

Part 101 requires point-to-point microwave systems to meet significant spectral efficiency requirements. Many systems employ efficiencies of 4-6 bps/Hz. Any usage fees should be based only upon bandwidth used rather than upon throughput, so that users can reap the reward of using more spectrally efficient modulation schemes.

Respectfully Submitted,

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